

FLOODING

A flood is an accumulation or an overflow of an expanse of water that covers or inundates dry land.

TYPES OF FLOODS

1 RIVERINE

This usually occurs when a river overflows its banks. It is usually due to the volume of water within a body of water, such as a river or lake, exceeding its capacity and overflowing its banks. It can also occur in rivers, when the velocity of the river is so high it flows right out of the river channel, usually at bends or meanders.

2 COASTAL

Floods from the sea can cause overflow or overtopping of flood defenses such as sea walls. A flood from the sea can be caused by a heavy storm (storm surge), a high tide, a tsunami, a cold front or a combination thereof.

3 FLASH FLOODING

This is a flood that rises and falls rapidly with little or no advance warning. Flash floods usually result from intense rainfall over a relatively small area.

4 URBAN FLOODING

This occurs as a result of land development. Permeable soil layers are being replaced by impermeable paved surfaces, through which water cannot infiltrate. This leads to greater runoff being generated, which can make rivers out of roadways and ponds out of car parks.



Urbanization - Flooding event in POS in 2007.

Flooding

CAUSES OF FLOODING:

NATURAL

1 Intense/Heavy Rainfall

When rain falls heavily, the rain drops hit the ground with force. This can cause the rain drops to bounce off the soil instead of infiltrating into the soil. The water from the rain is then forced to flow over the surface instead, thus increasing the surface runoff.

2 Prolonged rainfall

When rain falls for a prolonged period of time, the soil can become saturated. When the water is unable to infiltrate into the saturated soil, it is forced to flow over the soil, thus increasing surface runoff. Rivers that are unable to accommodate excess rain water overflow their banks onto neighbouring flood plains.

3 Relief

Relief refers to the difference in height between the highest point and the lowest point on land. When rain falls, the surface runoff can move very quickly from mountainous or hilly areas to low lying areas making these low lying areas more prone to flooding.



HUMAN INDUCED:

1 Deforestation

The lack of vegetation encourages water to flow over the surface rather than infiltrate into the soil thus increasing surface runoff.

2 Poor land use practices

Slash and burn agriculture, over-cultivation and over-grazing eventually cause the soil to become infertile and unable to sustain vegetative growth. Consequently, the lack of green cover encourages water to flow over the surface rather than infiltrate into the soil thus increasing surface runoff.

3 Urbanization

Urbanization leads to the replacement of permeable soil with that of an impervious layer of pitch and concrete, through which water cannot infiltrate. This results in increased surface runoff which leads to flash flooding.

4 Improper waste disposal

Oftentimes, garbage that is not properly disposed of enters into drainage systems and clogs drains. This obstructs the free flow of the water that enters into these drains causing water to back up during rainfall flooding the surrounding area. A build up of garbage can also obstruct the natural flow of water in rivers and streams.

5 Quarrying

This is the clearing of land for the removal of aggregates (mainly sand and gravel) which is to be utilized in the construction industry. The action of quarrying leaves land bare and devoid of any trees and shrubs thus increasing surface runoff.

EFFECTS OF FLOODING

1 Casualties

People may die as a result of drowning.

2 Health issues

Stagnant flood waters become a breeding ground for mosquitoes and can therefore lead to epidemics and diseases.

Vector borne diseases such as dengue and water borne diseases such as cholera and leptospirosis may be spread through contaminated flood waters.

3 Loss of livestock and agricultural crops

Livestock such as cows, goats and chickens may drown in flood water. Agricultural crops, which usually have shallow roots are easily swept away by fast moving water or may be lost when agricultural land becomes inundated by flood water. This can incur huge financial losses to the farmers.

4 Damage to property and infrastructure

Structures such as roads and bridges may collapse and limit accessibility especially to rural areas. Landslides can also take place blocking roads and destroying anything in its path such as houses and agriculture.



Evacuation of homes.

COMMON TERMS ASSOCIATED WITH FLOODING

TERM	DEFINITION
FLOOD PLAIN	An area of usually flat land adjacent to the river that experiences occasional flooding.
RIVER CHANNEL	The wetted perimeter or surface with which a river comes into contact.
RIVER BANK	The sloping land that immediately borders the river channel.
FLOOD FORECASTING	The use of actual precipitation and stream flow data to predict or estimate water levels in a river basin.
FLOOD WATCH	A flood watch is issued when weather conditions favour heavy rainfall and flash flooding.
LEVEES	Natural or artificial slopes that run parallel to the river course. They are raised above the normal level of the flood plain due to the deposition of river material after a series of floods.



Do not drive through flood waters, abandon car if flood waters are too high.



PRECAUTIONARY MEASURES

- ◆ Before building, check the area for signs or a history of flooding and find out how many feet above ground level you need to build your house. If building in a flood prone area purchase flood insurance.
- ◆ Locate houses and buildings away from flood prone areas such as river banks and flood plains.
- ◆ Do not throw garbage or large unwanted appliances or other forms of white waste into rivers, ravines or drains. Utilize proper available waste disposal methods.
- ◆ Maintain all drainage systems. Clear river channels of debris and overgrown vegetation. This will facilitate easier flow of water in the river channel. Keep gutters and downpipes clear of debris and garbage as well.
- ◆ Construct flood barriers where necessary to prevent flood water from entering buildings and homes.

BEFORE A FLOOD

- ◆ Develop a Family Emergency Plan.
- ◆ Make sure all family members know what immediate actions to take to ensure their personal safety. Preparing a Family Evacuation Plan can assist in this regard.
- ◆ Secure all important documents such as birth certificates, passports and the like in water proof bags or sealed containers.
- ◆ Tie down all containers especially those that have explosive liquids.
- ◆ Secure valuables and park vehicles in places that will not become flooded.
- ◆ Secure pets on higher ground. If unable to take pets with you let pets loose so that they will be able to seek higher ground on their own.

DURING A FLOOD

- ◆ Stay calm. Listen to the radio or television for updated information.
- ◆ Move to upper levels of buildings or houses if the lower levels are threatened by flood waters.
- ◆ Turn off utilities such as electricity, gas and water at the main switches. Do not touch electrical equipment if you are standing in water or are wet.
- ◆ Do not drive through flood waters. If flood waters rise around your car, abandon the car and move to higher ground once it is safe to do so.
- ◆ Do not seek shelter under culverts or bridges.
- ◆ Advise children never to play in flood waters.

AFTER THE FLOOD

- ◆ Do not walk through flood waters unless it is absolutely necessary. Be careful of hidden objects and broken glass when walking in water. If you have to walk in flood water, walk where the water is not moving and use a stick to check the firmness of the ground in front of you.
- ◆ Exercise extreme caution when entering buildings as there may be hidden damage, particularly in foundations.
- ◆ Gas and fuel pipes may have been damaged. Use flashlights instead of open flames to investigate buildings.

- ◆ Report broken utility lines to the public utility company (T&TEC, WASA or TSTT).
- ◆ Do not touch live electrical equipment in wet areas.
- ◆ If injured seek medical assistance at the nearest hospital, health centre or first aid station.
- ◆ Do not consume food that has come into contact with flood waters.
- ◆ Boil drinking water for at least 10-15 minutes before drinking or treat with sterilization tablets where available.
- ◆ Bury all dead animals as soon as possible.
- ◆ Clear all debris from drains and channels near your home as soon as it is safe to do so.



FLOOD PRONE AREAS IN TRINIDAD
Some areas affected by flooding in Trinidad (Water Resources Agency)

CENTRAL
Kelly Village, Caroni, Warren, Bejucal, Caparo, Palmiste, Longdenville, Lange Park, Montrose, Arena, Ravine Sable, St Helena, La Paille Village

SOUTH
Penal, Barrackpore, Woodland, Papourie, Guaracara, Tarouba, Marabella, Gulf City, Cipro, Gasparillo, Guapo, Cap-de-Ville, Siparia, Erin, Palo Seco, Claxton Bay, California, Usine Ste Madeline, Princess Town, Mayaro, Mafeking Village, San Fernando, South Oropouche, Victoria Village, Ortoire Navet

NORTH
Moka, Maraval, St. Ann's, Cascade, Belmont, Port of Spain, Diego Martin, Cocorite, North Coast Road, Barataria

EAST
Sangre Grande, Cunapo, El Reposo, Fishing Pond, Plum Mitan, Santa Cruz, Saddle Road, Cantaro, Pipiol, Mount Lambert, Lopinot, Arima, Arouca, Oropuna, St Helena Village, Piarco



A Division of the Ministry of National Security

In an emergency, being prepared is key... so let's PLAN and PREPARE in order to safeguard our families, our community and country.

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The Water Resources Agency



WATER AND SEWERAGE AUTHORITY
179 - 181, Eastern Main Road, Barataria

To effectively manage and control the use of the country's water resources and to promote conservation, development and protection of these resources in a cost-effective manner for sustainable socio-economic growth.



Everything you need to know about
FLOODING